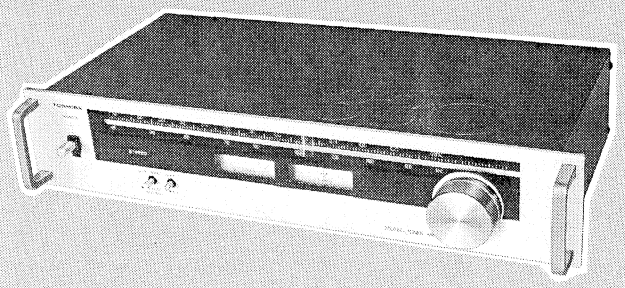
TOSHIBA

AM/FM STEREO TUNER

ST-330



SPECIFICATIONS

FM Tuner Section	
Receiving Frequency:	88 MHz to 108 MHz
Sensitivity (IHF):	2.0μV
Harmonic Distortion:	MONO 0.2%
	STEREO 0.4%
S/N:	MONO 73 dB
Frequency Response:	30 Hz to 15 kHz ±1 dB
Selectivity (IHF):	60 dB
Image Rejection:	50 dB
IF Rejection:	80 dB
Capture Ratio:	1.0 dB
Spurious Response:	70 dB
AM Suppression:	45 dB
Stereo Separation:	40 dB (at 400 Hz)

AM Tuner Section	
Receiving Frequency:	525 kHz to 1605 kHz
Sensitivity (S/N 20 dB):	300μV/m
Selectivity:	25 dB
Image Rejection:	40 dB
S/N:	45 dB
General	
Power Supply:	AC 220V or AC 240V 50 Hz
Power Consumption:	6W
Weight:	3.0 kg
Dimensions (W x H x D):	450 x 97 x 265 (m/m)

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1. OPERATING CONTROLS

FRONT VIEW

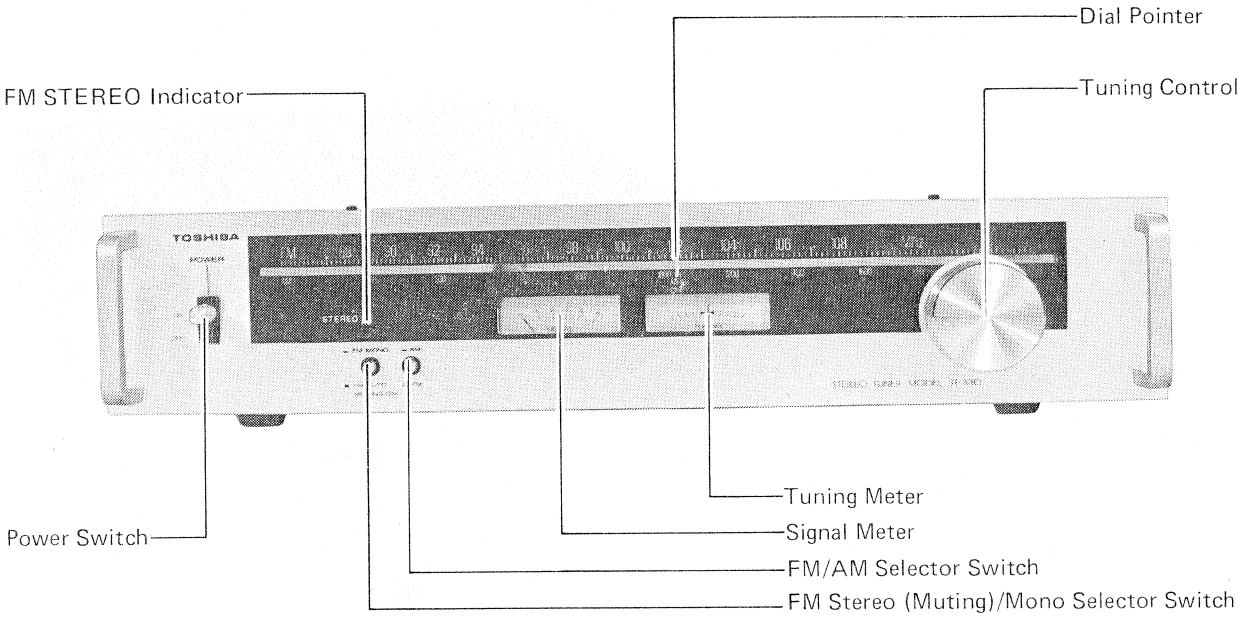


Figure 1

REAR VIEW

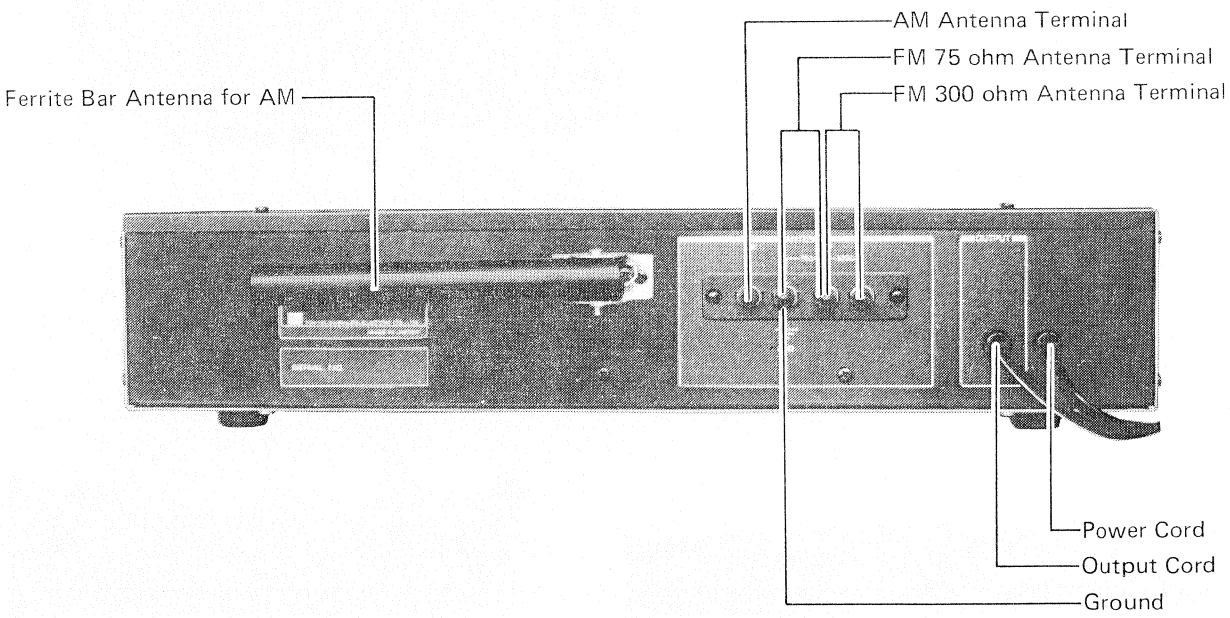


Figure 2

2. DISASSEMBLY INSTRUCTIONS

TOP COVER REMOVAL (Figure 3)

1. Remove 4 screws Ⓐ.
2. Separate the Top Cover from the Set.

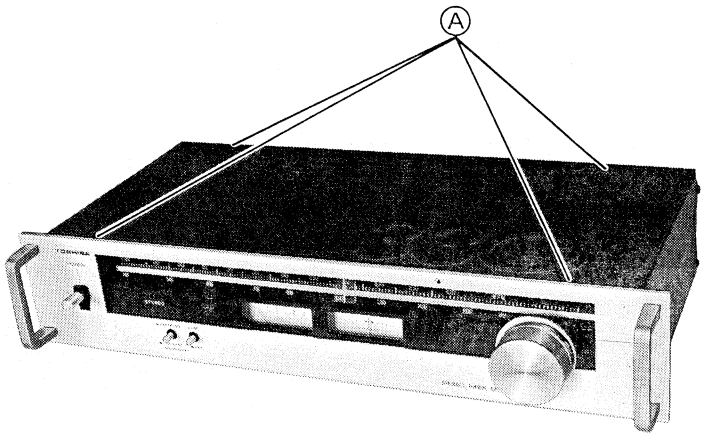


Figure 3

BOTTOM PLATE REMOVAL (Figure 4)

1. Remove 4 screws Ⓑ
2. Separate the Bottom Plate from the Set.

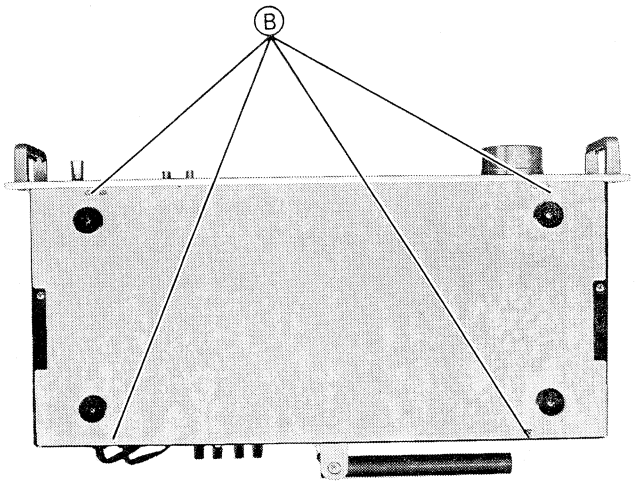


Figure 4

FRONT PANEL REMOVAL (Figure 5, 6)

1. Remove 2 Knobs Ⓒ (Power Tuning).
2. Remove 2 Screws Ⓓ (Top).
3. Remove 2 Screws Ⓔ (Bottom).
4. Separate the Front Panel from the Set.

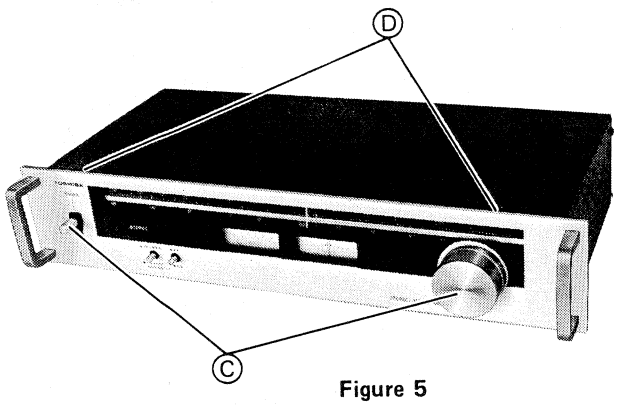


Figure 5

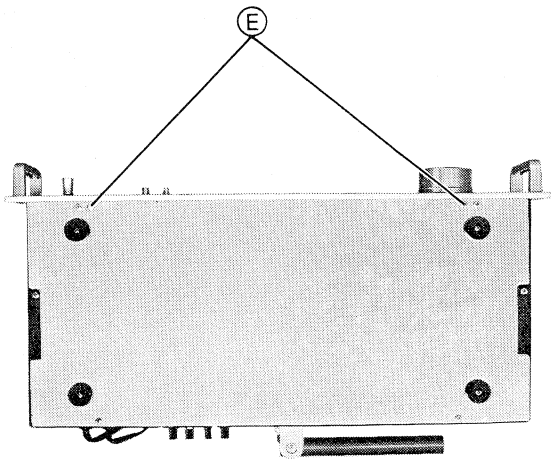


Figure 6

3. BLOCK DIAGRAM

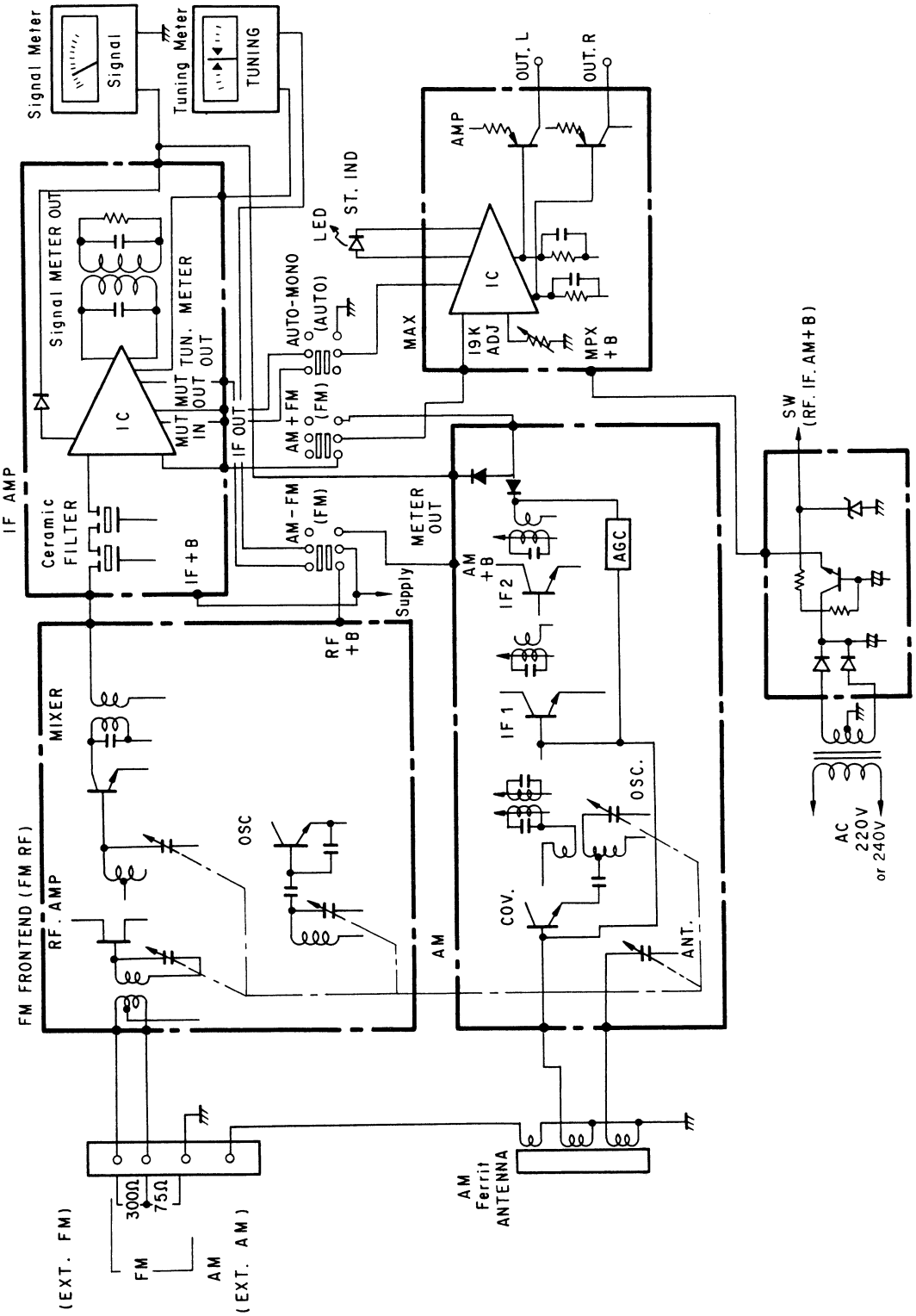


Figure 7

4. ADJUSTING PARTS LOCATIONS

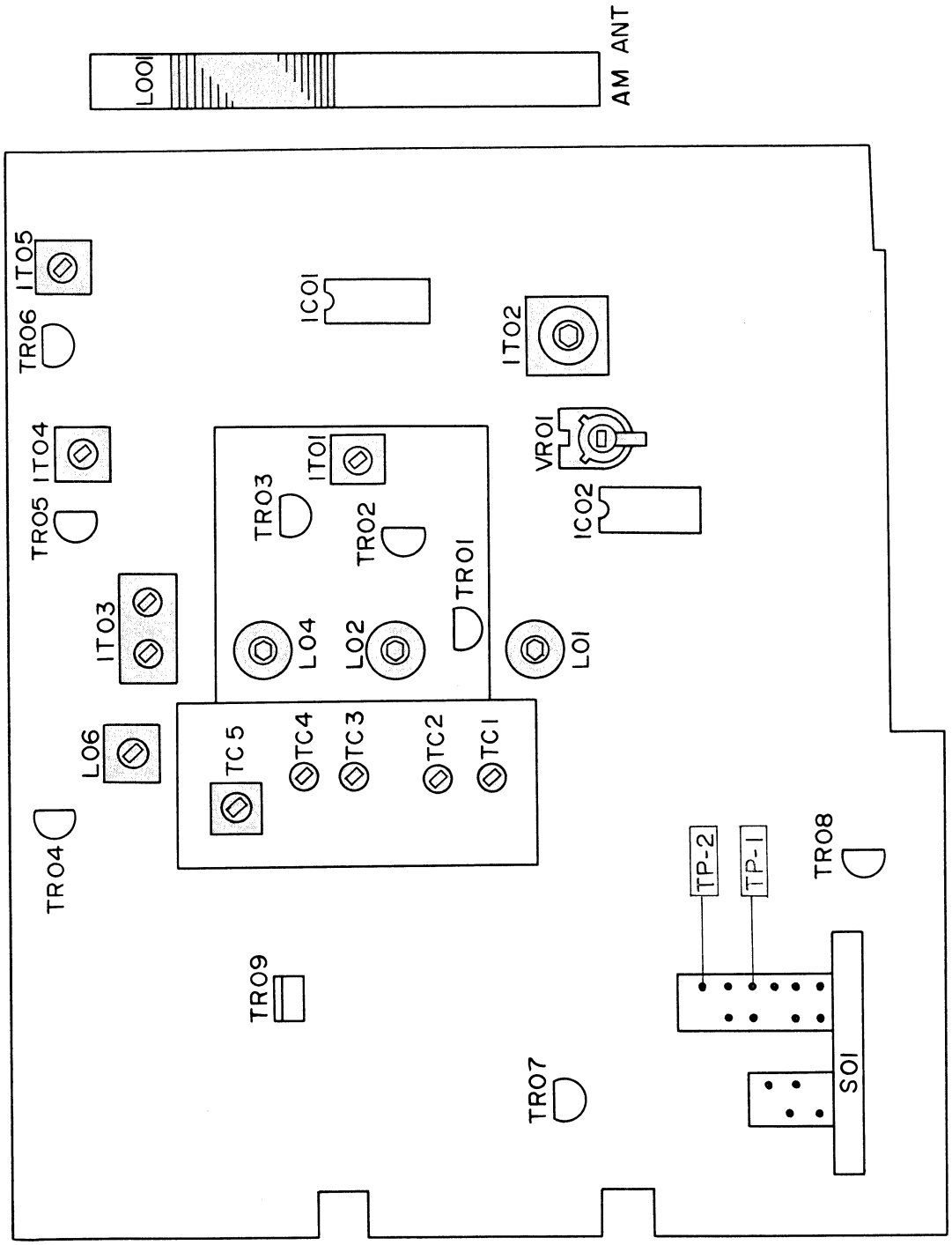


Figure 8

5. ADJUSTMENT INSTRUCTIONS

AM ADJUSTMENT

Test equipments/Tools required

1. Signal generator
2. Sweep generator
3. Test loop antenna
4. VTVM
5. Adjusting screwdriver
6. Adjusting screwdriver (Use to antenna core)
7. Oscilloscope

IF ADJUSTMENT

Step	Adjustment	Remarks
IF Response	IT-03, IT-04, IT-05 IF Transformer	Adjust for scope pattern with specified marker (455 kHz) as illustrated in Fig.9

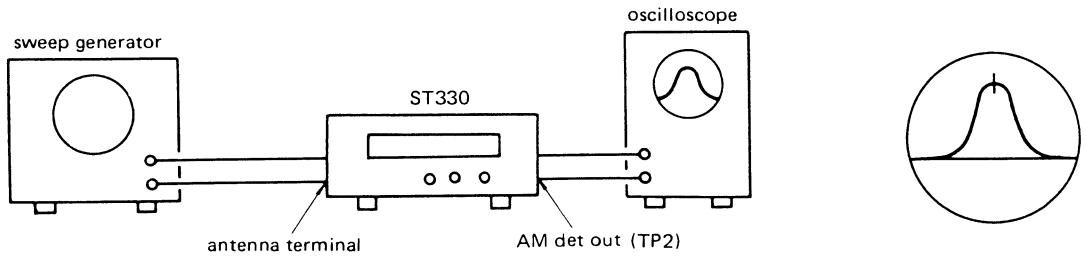


Figure 9

FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Step	Adjusting Circuit	Connection		SG Frequency	Position of Tuning Dial	Adjustment	VTVM
		Input	Output				
1	OSC (Frequency Coverage)	Connect signal generator to test loop.	Connect VTVM to output terminal.	540 kHz (400 Hz 30% MOD.)		L06	Maximum
2				1600 kHz (400 Hz 30% MOD.)	Set the tuning gang	TC4	
Repeat steps 1 and 2.							
3	ANT (Tracking)	Connect signal generator to test loop.	Connect VTVM to output terminal.	600 kHz (400 Hz 30% MOD.)	Tune to 600 kHz signal	L001	Maximum
4				1400 kHz (400 Hz 30% MOD.)	Tune to 1400 kHz Signal	TC2	Maximum
Repeat steps 3 and 4.							

Note: When adjusting the AM tuner section, inductively connect the minimum input signal to the set.

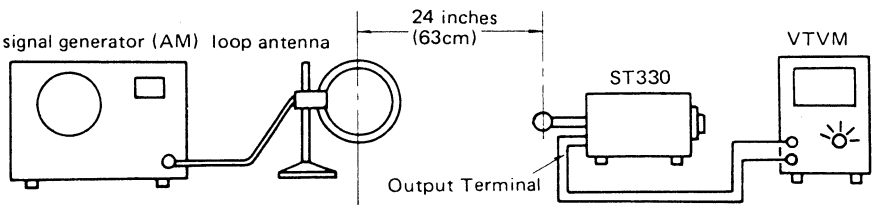


Figure 10

FM ADJUSTMENT

Test equipments/Tools required

1. Sweep marker generator
2. Signal generator
3. Osilloscope
4. VTVM
5. FM dummy antenna (300 ohms)
6. Dummy load resistor
7. Network
8. Adjusting screwdriver
9. Adjusting bar

Step	Adjusting Circuit	Connection		SG Frequency	Position of Tuning Dial	Adjustment	VTVM
		Input	Output				
1	IF	Connect sweep generator to FM ANT. terminal (300 ohm)	Connect oscilloscope to TP1 (FM DET. OUT.).	10.7 MHz	Near max. capacity of VC. at position with no unrequired signal.	IT01 IT02 (Upper core only)	10.7 MHz 75 kHz 150 kHz
2	Radio Det.		Connect oscilloscope to TP1 (FM DET. OUT.)			IT02 (Lower core only)	75 kHz
3	OSC (Frequency coverage)	Connect FM signal generator to FM ANT. terminal (300 ohm)	Connect VTVM to output terminal.	87.5 MHz (400 Hz 30% MOD.)	Low end of dial scale	L04	Maximum
4				108 MHz (400 Hz 30% MOD.)	Set the tuning gang at 108 MHz.	TC5 Trimmer	
Repeat steps 3 and 4.							
5	RF	Connect FM signal generator to FM ANT. terminal.	Connect VTVM to output terminal.	88 MHz (400 Hz 30% MOD.)	Tune to 88 MHz signal.	L01 L02	Maximum
6				108 MHz (400 Hz 30% MOD.)	Tune to 108 MHz signal.	TC1 TC3	
Repeat steps 5 and 6.							

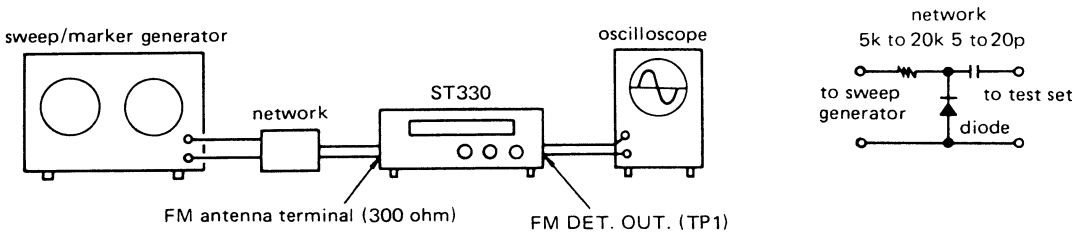


Figure 11

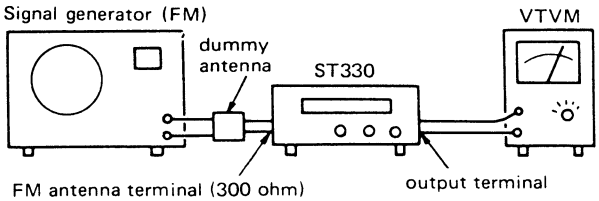


Figure 12

CAUTION: When realigning the FM receiving frequency, the lowest side of the frequency range must not be below 87.5 MHz in order to comply with FTZ regulations in West Germany.

FM MPX ADJUSTMENTS

Test Equipments/Tools required

1. Frequency counter
2. Signal generator
3. Stereo modulator
4. VTVM
5. 300 ohm FM dummy antenna
6. Oscilloscope

Step	Procedure
Free-running frequency adjustment	Connect a frequency counter to the Test Point (TP) of IC02 (No.12pin), and adjust the VR01 for 18.9 kHz reading counter with no-signal input. Note: Connect the lead wire across the IC04 (No.2pin) and ground.

6. DIAL CORD RESTRINGING

STRINGING SEQUENCE

1. Wind the cord two times on the drum with the variable capacitors wings closed (tuning knob fully counter-clockwise).
2. Hook the cord on the pulley.
3. Wind the cord two times on the tuning shaft.
4. After stringing, make certain the cord is not overlaid by turning the tuning shaft.

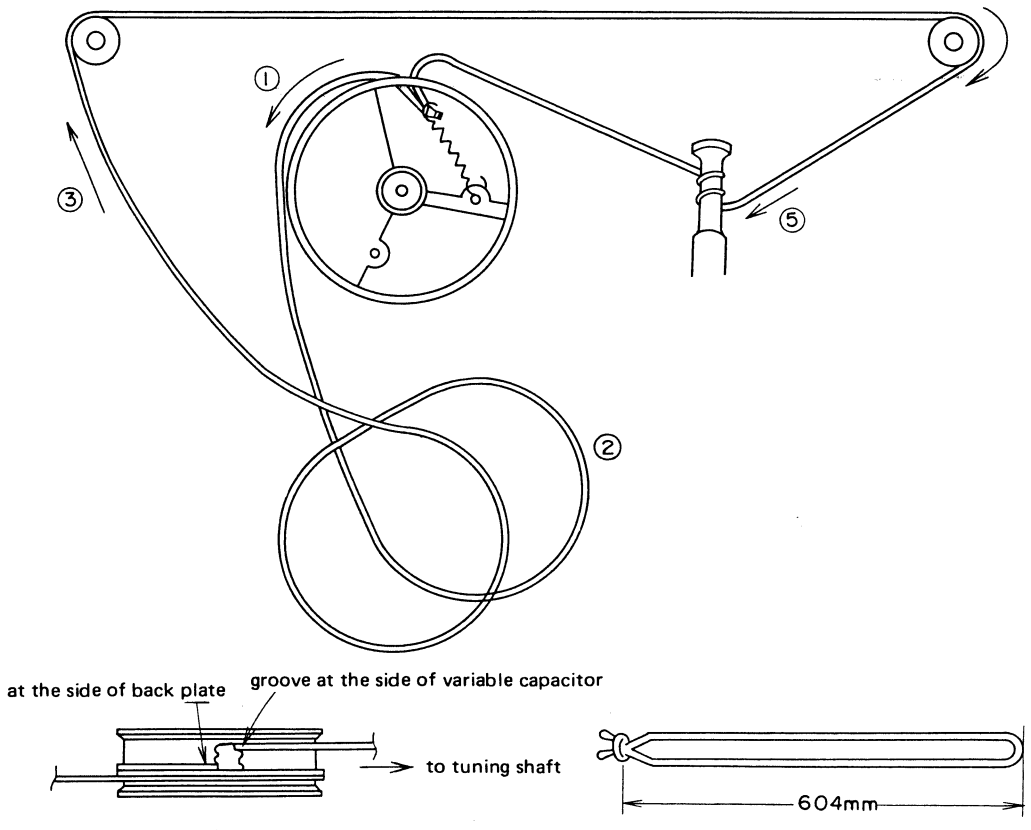
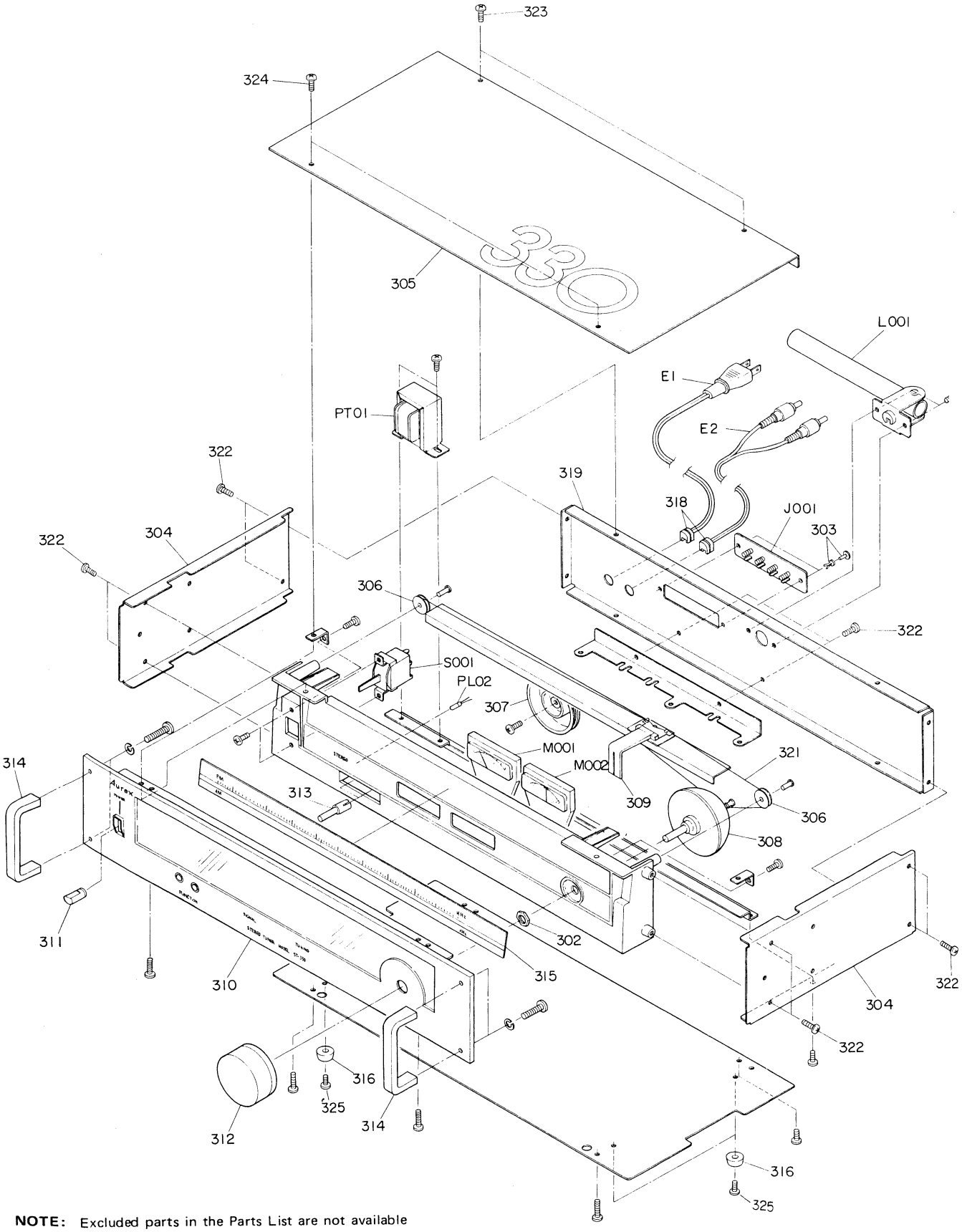


Figure 13

7. CABINET EXPLODED VIEW



NOTE: Excluded parts in the Parts List are not available as replacement parts.

Figure 14.

8. ELECTRICAL PARTS LOCATIONS

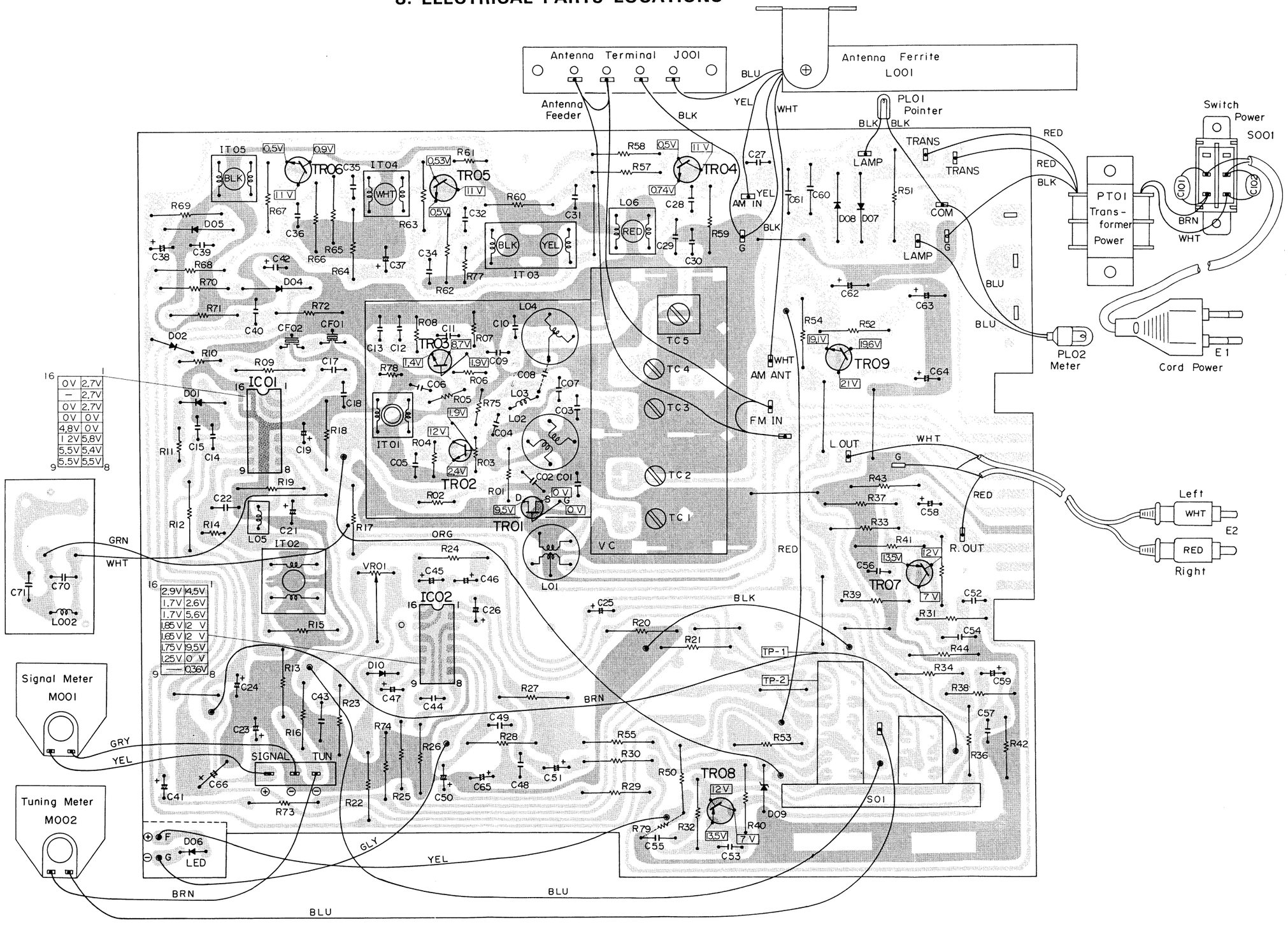


Figure 15.

9. SCHEMATIC DIAGRAM

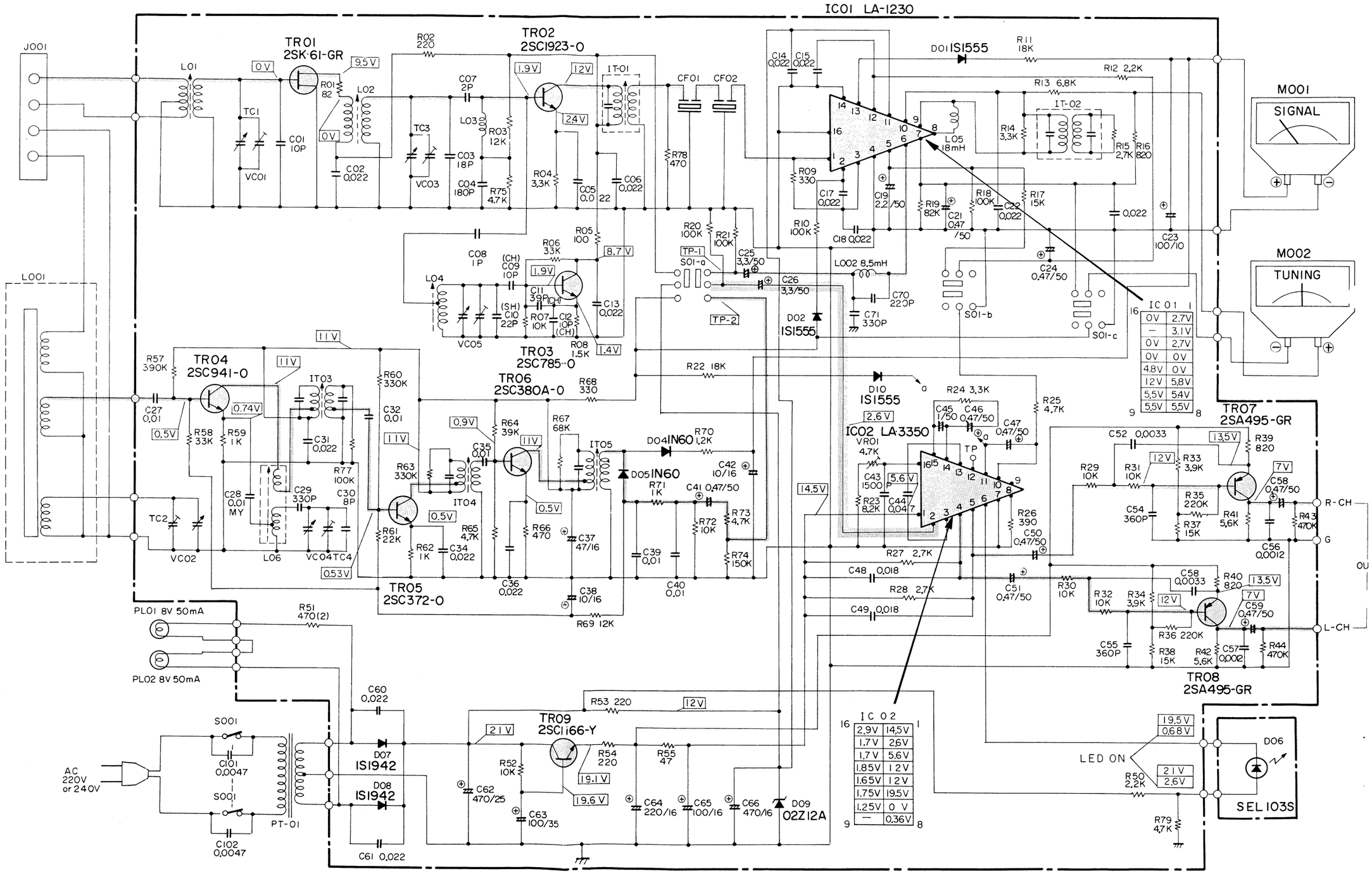
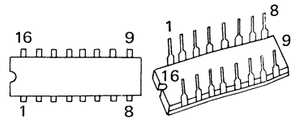


Figure 16.



LA1230
LA3350

2SC1166-Y

2SA495-GR
2SC372-O
2SC380-O
2SC785-O
2SC941-O

2SK61-GR

Switch Position
S01a, c FM-AF Switch ..... FM
S01b AUTO-MONO Switch ..... AUT
S001 Power Switch ..... OF

10. PARTS LIST

Symbol No.	Part No.	Description
		CABINET PARTS
301	20866009	Spring, Dram
302	22702107	Nut, 9ϕ, Tuning Shaft
303	22705022	Rivet, Plastic 3ϕ x 5.5mm
304	22711450	Plate, Side
305	22711451	Cover, Top
306	22742099	Pulley, Dial
307	22742149	Dial Drum, L240
308	22749174	Tuning Shaft Ass'y
309	22749185	Pointer Ass'y
310	22821352	Panel Ass'y
311	22824215	Knob Ass'y, Power
312	22824216	Knob Ass'y, Tuning
313	22824217	Knob Ass'y, Push
314	22839086	Handle
315	22847345	Plate, Dial
316	22874033	Foot
318	25845120	Bush, Cord
319	22711529	Plate, Jack
322	22701326	Screw, BID 3ϕ x 8mm, Black (Tapping)
323	22701237	Screw, BID 3ϕ x 6mm, Black (Tapping)
324	22707066	Screw, BID 3ϕ x 6mm, Black
325	71233016	Screw, BID 3ϕ x 16mm, Tapping
		IC'S, TRANSISTORS & DIODES
IC01	22114443	IC, LA1230
IC02	22114416	IC, LA3350
TR01		Transistor, 2SK61-GR
TR02		Transistor, 2SC1923-O
TR03		Transistor, 2SC785-O
TR04		Transistor, 2SC941-O
TR05		Transistor, 2SC372-O
TR06		Transistor, 2SC380A-O
TR07, 08		Transistor, 2SA495-Y
TR09		Transistor, 2SC1166-Y
D01, 02, 03		Diode, 1S1555V
D04, 05		Diode, 1N60-FD1
D06	22115383	Diode, SEL103S
D07, 08		Diode, 1S1942
D09		Diode, 02Z12A
		COILS & TRANSFORMERS
L01	22292078	Coil, FM, RT51S2078
L02	22294294	Coil, FM, RT8024-F
L03	22291082	Coil, FM, LH3003
L04	22295062	Coil, FM, RT81S5062
L05	22241036	Coil, RF Choke, RT8121036
L06	22245288	Coil, Oscillator, RT7255288
L001	22242642	Coil, Ferrite Antenna, FA22D26400
L002	22211232	Coil, RF Choke, LH-09-1232
PT01	22223113	Transformer, Power

Symbol No.	Part No.	Description
IT01	22265727	Transformer, I-F, IT16S5727
IT02	22265723	Transformer, I-F, IT8825723
IT03	22264643	Transformer, I-F, 1106B
IT04	22264462	Transformer, I-F, IT15D4462
IT05	22266326	Transformer, I-F, IT15S6326
		ELECTRICAL PARTS
S01	22146200	Switch, Push FM/AM Change
S001	22195049	Switch, Lever, Power
M001	22104343	Meter, Signal
M002	22104342	Meter, Tuning
PL01	22113391	Lamp, Pointer 8V, 50mA
PL02	22113239	Lamp, Meter 8V, 50mA
J001	22162278	Terminal, Antenna, S-4P
CF01, 02	22153028	Ceramic Filter
E1	22176286	Cord, Power
E2	22170352	Cord, USPIN
		CAPACITORS D = ±0.5pF, J = ±5%, K = ±10%, M ±20%, Z = $^{+80\%}_{-20\%}$
C01	22361100	Ceramic, 10pF, 50V, J
C02	22342223	Ceramic, 0.022mfd, 50V, Z
C03	22361180	Ceramic, 18pF, 50V, J
C04	22362181	Ceramic, 180pF, 50V, K
C05	22342223	Ceramic, 0.022mfd, 50V, Z
C06	22342223	Ceramic, 0.022mfd, 50V, Z
C07	22361209	Ceramic, 2pF, 50V, D
C08	22361109	Ceramic, 1pF, 50V, D
C09	22360131	Ceramic, 10pF, 50V, J
C10	22360154	Ceramic, 22pF, 50V, J
C11	22360137	Ceramic, 39pF, 50V, J
C12	22360131	Ceramic, 10pF, 50V, J
C13	22342223	Ceramic, 0.022mfd, 50V, Z
C14	22342223	Ceramic, 0.022mfd, 50V, Z
C15	22342223	Ceramic, 0.022mfd, 50V, Z
C17	22342223	Ceramic, 0.022mfd, 50V, Z
C18	22342223	Ceramic, 0.022mfd, 50V, Z
C19	22448229	Electrolytic, 2.2mfd, 50V
C21	22448478	Electrolytic, 0.47mfd, 50V
C22	22342223	Ceramic, 0.022mfd, 50V, Z
C23	22443101	Electrolytic, 100mfd, 10V
C24	22448478	Electrolytic, 0.47mfd, 50V
C25	22448339	Electrolytic, 3.3mfd, 50V
C26	22448339	Electrolytic, 3.3mfd, 50V
C27	22342103	Ceramic, 0.01mfd, 50V, Z
C28	22372103	Mylar, 0.01mfd, 50V, K
C29	22321049	Polyproplene, 330pF, 50V, J
C30	22361809	Ceramic, 8pF, 50V, D
C31	22342223	Ceramic, 0.022mfd, 50V, Z
C32	22342103	Ceramic, 0.01mfd, 50V, Z
C34	22342223	Ceramic, 0.022mfd, 50V, Z
C35	22342103	Ceramic, 0.01mfd, 50V, Z
C36	22342223	Ceramic, 0.022mfd, 50V, Z

Symbol No.	Part No.	Description
C37	22445470	Electrolytic, 47mfd, 16V
C38	22445100	Electrolytic, 10mfd, 16V
C39	22372103	Mylar, 0.01mfd, 50V, K
C40	22372103	Mylar, 0.01mfd, 50V, K
C41	22448478	Electrolytic, 0.47mfd, 50V
C42	22445100	Electrolytic, 10mfd, 16V
C43	22321059	Polyproplene, 1500pF, 50V, J
C44	22372473	Mylar, 0.047mfd, 50V, K
C45	22448109	Electrolytic, 1mfd, 50V
C46	22448478	Electrolytic, 0.47mfd, 50V
C47	22448478	Electrolytic, 0.47mfd, 50V
C48	22372183	Mylar, 0.018mfd, 50V, K
C49	22372183	Mylar, 0.018mfd, 50V, K
C50	22448478	Electrolytic, 0.47mfd, 50V
C51	22448478	Electrolytic, 0.47mfd, 50V
C52	22372332	Mylar, 0.0033mfd, 50V, K
C53	22372332	Mylar, 0.0033mfd, 50V, K
C54	22321016	Polyproplene, 360pF, 50V, J
C55	22321016	Polyproplene, 360pF, 50V, J
C56	22371122	Mylar, 0.0012mfd, 50V, J
C57	22371122	Mylar, 0.0012mfd, 50V, J
C58	22448478	Electrolytic, 0.47mfd, 50V
C59	22448478	Electrolytic, 0.47mfd, 50V
C60	22340032	Ceramic, 0.02mfd, 500V, Z
C61	22340032	Ceramic, 0.02mfd, 500V, Z
C62	22446471	Electrolytic, 470mfd, 25V
C63	22447101	Electrolytic, 100mfd, 35V
C64	22445221	Electrolytic, 220mfd, 16V
C65	22445101	Electrolytic, 100mfd, 16V
C66	22445102	Electrolytic, 1000mfd, 16V
C67	22361100	Ceramic, 10pF, 50V, J
C70	22362221	Ceramic, 220pF, 50V, K
C71	22362331	Ceramic, 330pF, 50V, K
C101	22340090	Ceramic, 0.0047mfd, 250V, Z
C102	22340090	Ceramic, 0.0047mfd, 250V, Z
VC	22307353	Variable Capacitor
RESISTORS		
Resistors are fixed carbon film ±5%, ¼W, unless otherwise noted. K = 1000		
R01	22555820	82 ohm
R02	22555221	220 ohm
R03	22555123	12K ohm
R04	22555332	3.3K ohm
R05	22545101	100 ohm
R06	22555333	33K ohm
R07	22555103	10K ohm
R08	22555152	1.5K ohm
R09	22545331	330 ohm
R10	22555104	100K ohm
R11	22555223	22K ohm
R12	22545222	2.2K ohm
R13	22545682	6.8K ohm
R14	22555332	3.3K ohm

Symbol No.	Part No.	Description
R15	22545272	2.7K ohm
R16	22545821	820 ohm
R17	22545153	15K ohm
R18	22545104	100K ohm
R19	22545823	82K ohm
R20	22545104	100K ohm
R21	22545104	100K ohm
R22	22545183	18K ohm
R23	22545822	8.2K ohm
R24	22545332	3.3K ohm
R25	22545472	4.7K ohm
R26	22545391	390 ohm
R27	22545272	2.7K ohm
R28	22545272	2.7K ohm
R29	22545103	10K ohm
R30	22545103	10K ohm
R31	22545103	10K ohm
R32	22545103	10K ohm
R33	22545392	3.9K ohm
R34	22545392	3.9K ohm
R35	22545224	220K ohm
R36	22545224	220K ohm
R37	22545153	15K ohm
R38	22545153	15K ohm
R39	22545821	820 ohm
R40	22545821	820 ohm
R41	22545562	5.6K ohm
R42	22545562	5.6K ohm
R43	22545474	470K ohm
R44	22545474	470K ohm
R50	22545222	2.2K ohm
R51	22570093	470 ohm, 2W, Metal Oxided Film
R52	22545103	10K ohm
R53	22545221	220 ohm
R54	22545221	220 ohm
R55	22545470	47 ohm
R57	22545394	390K ohm
R58	22545333	33K ohm
R59	22545102	1K ohm
R60	22545334	330K ohm
R61	22555223	22K ohm
R62	22545102	1K ohm
R63	22545334	330K ohm
R64	22545393	39K ohm
R65	22545472	4.7K ohm
R66	22545471	470 ohm
R67	22545683	68K ohm
R68	22545331	330 ohm
R69	22545123	12K ohm
R70	22545222	2.2K ohm
R71	22545102	1K ohm
R72	22545103	10K ohm
R73	22545472	4.7K ohm
R74	22545154	150K ohm

Symbol No.	Part No.	Description
R75	22555472	4.7K ohm
R77	22555104	100K ohm
R78	22555471	470 ohm
R79	22545472	4.7K ohm
VR01	22658179	Semi-fixed Variable, 5K ohm
	ACCESSORIES	
	22124452	Antenna Feeder Ass'y
	22954551	Owner's Manual